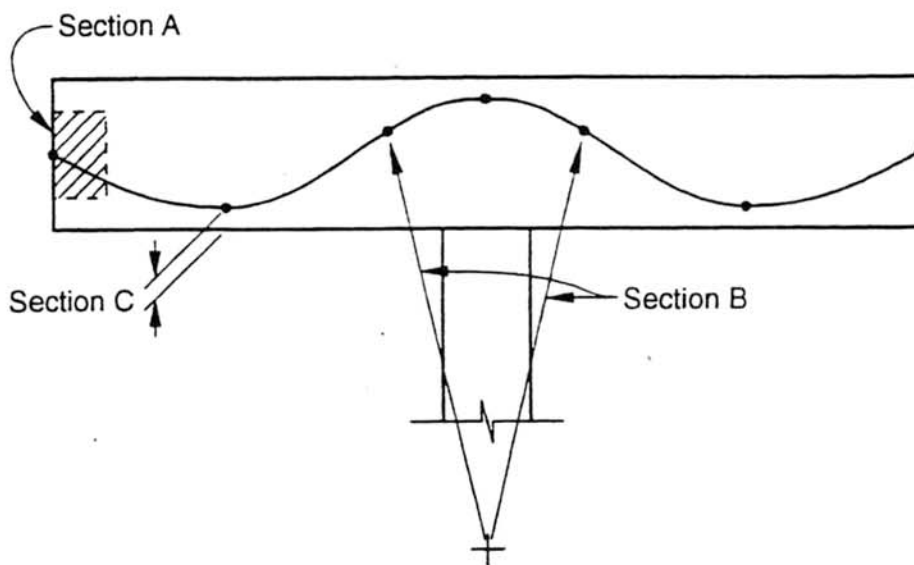




Prestress Clearances for CIP P/S Box Girder Structures

This memo is divided into three sections, anchorage zone clearances, tendon curvature, and determination of maximum eccentricities.



Section A Clearance at Anchorage Zones

Recommendations for Stems and Anchorage Space for Prestressed "CIP" Box Girders

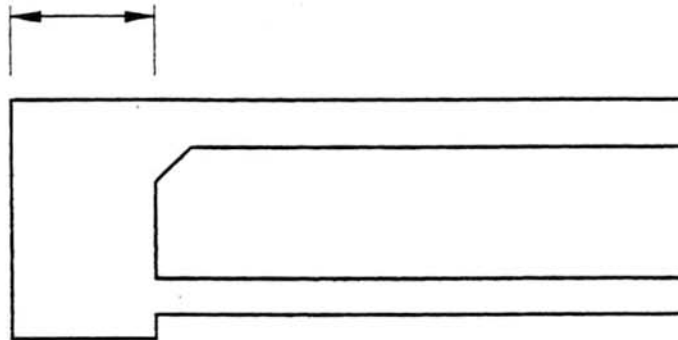
Kips per Girder " P_{jack} "	Stem Thickness (Inches)	Anchorage Space Requirements	
		Width (Inches)	Height (Inches)
0 - 1,000	12	27	27
1,000 - 1,500	12	27	41
1,500 - 2,000	12	27	54
2,000 - 2,500	12	27	68
2,500 - 3,500	12	27	81
3,500 - 4,000	12	27	89
4,000 - 5,000	12	27	105

Supersedes Memo to Designers 11-28 dated May 1989

**Section A**
*continued***Recommended Diaphragm Dimensions**

Skew (Degrees)	Min. Diaphragm Thickness at Abutment	At Hinge
0 - 14	2' - 6"	2' - 0" *
15 - 29	3' - 3"	2' - 9"
30 - 44	4' - 0"	3' - 6"
45 - 55	4' - 9"	4' - 3"

* To accommodate spiral.

**Section B**
**Tendon and
Duct Curvature**

The use of sharp curvatures for the tendon path in the vertical plane can result in large forces normal to the duct. Where tendons are bundled, these forces can squash the ducts. Most CIP/PS structures have fairly flat cable paths, with the exception of post-tensioned bent caps.

The cable path should have an equivalent circular curvature radius greater than sixty feet. If less than sixty feet, normal forces due to the prestressing should be investigated. Possible solutions include greater duct clearances than required by Standard Plan B8-5, or extra reinforcement around the duct in the region of sharp curvature.

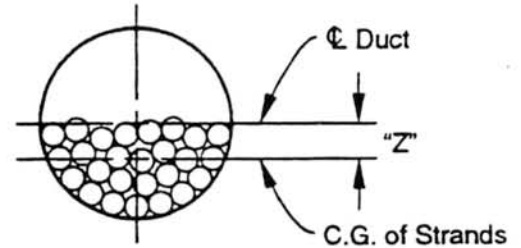
**Section C****Maximum Cable
Path Eccentricities**

Use the recommended "D" value from the attached "D Chart" as a first trial. Revise "D" as required, following determination of " P_{jack} ". Run analysis again based on the new "D" value.

See Memo to Designers 17-146 for prestressing requirements for the Southern Pacific Transportation Co. (SPTCo.) for railroad bridges.

The amount of tendon offset within the duct (the "Z" value) considered in charts is as follows:

Duct Size	"Z" Value
3" OD and less	$\frac{1}{2}$ "
Over 3" OD to 4"	$\frac{3}{4}$ "
Over 4" OD	1"



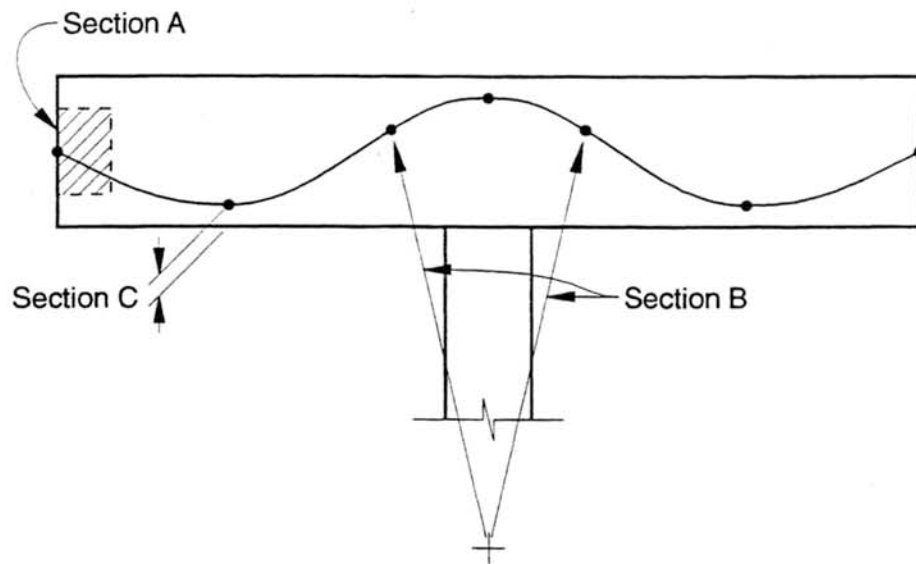
Jerry A. McKee
Design Supervisor

Floyd L. Mellon
Design Supervisor

Attachments
EKT:jgf

11-28 PRESTRESS CLEARANCES FOR CIP P/S BOX GIRDER STRUCTURES

This memo is divided into three sections, anchorage zone clearances, tendon curvature, and determination of maximum eccentricities.



Memo converted to metric.

Section A Clearance at Anchorage Zones

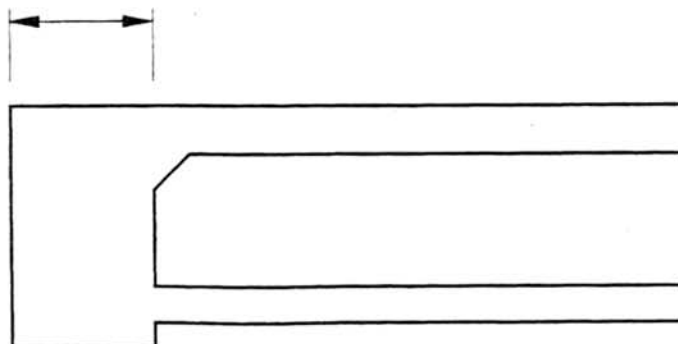
Recommendations for Stems and Anchorage Space for Prestressed "CIP" Box Girders

kN per Girder "P _{jack} " kN	Stem Thickness (mm)	Anchorage Space Requirements	
		Width (mm)	Height (mm)
0 – 4 500	300	700	700
4 500 – 6 750	300	700	1050
6 750 – 9 000	300	700	1400
9 000 – 11 250	300	700	1750
11 250 – 15 750	300	700	2050
15 750 – 18 000	300	700	2250
18 000 – 22 500	300	700	2650

Recommended Diaphragm Dimensions

Skew (Degrees)	Min. Diaphragm Thickness at Abutment (mm)	At Hinge (mm)
00 – 14	800	600 *
15 – 29	1000	850
30 – 44	1200	1050
45 – 55	1500	1300

* To accommodate spiral.



Section B Tendon and Duct Curvature

The use of sharp curvatures for the tendon path in the vertical plane can result in large forces normal to the duct. Where tendons are bundled, these forces can squash the ducts. Most CIP/PS structures have fairly flat cable paths, with the exception of post-tensioned bent caps.

The cable path should have an equivalent circular curvature radius greater than 18 meters. If less than 18 meters, normal forces due to the prestressing should be investigated. Possible solutions include greater duct clearances than required by Standard Plan B8-5, or extra reinforcement around the duct in the region of sharp curvature.

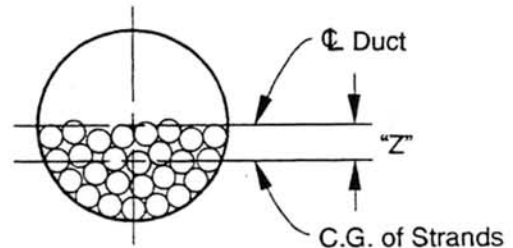
Section C Maximum Cable Path Eccentricities

Use the recommended "D" value from the attached "D Chart" as a first trial. Revise "D" as required, following determination of " P_{jack} ". Run analysis again based on the new "D" value.

See Memo to Designers 17-140 for prestressing requirements for the Southern Pacific Transportation Co. (SPTCo.) for railroad bridges.

The amount of tendon offset within the duct (the "Z" value) considered in charts is as follows:

Duct Size	"Z" Value
75 mm OD and less	13 mm
Over 75 mm OD to 100 mm	20 mm
Over 100 mm OD	26 mm

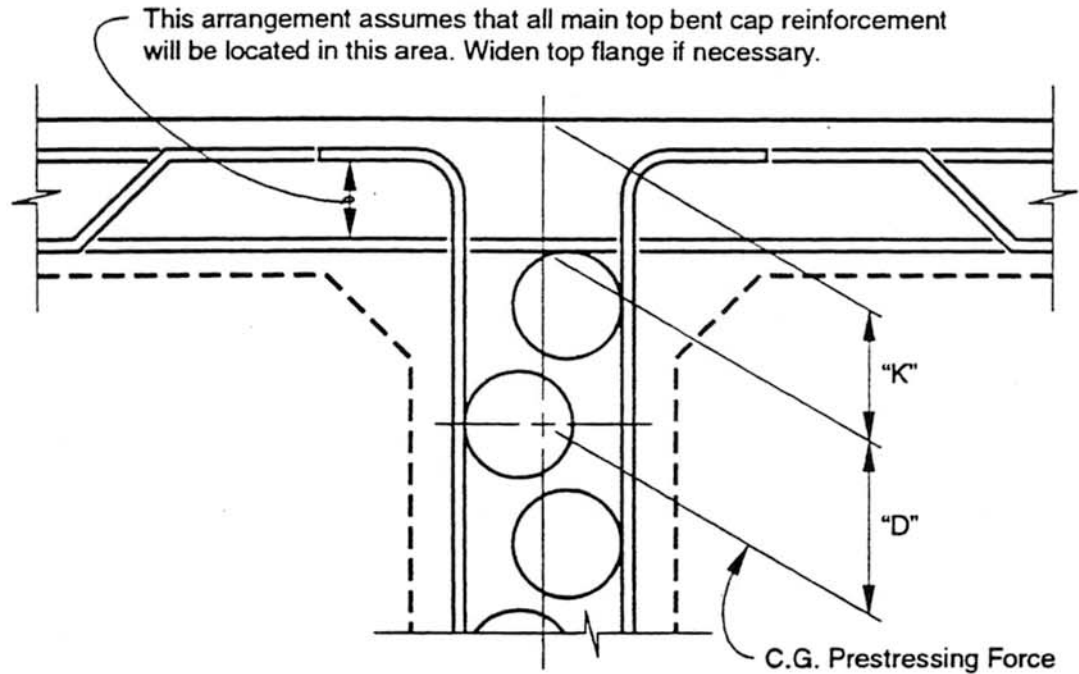


Richard D. Land
Richard D. Land

Shannon H. Post
Shannon H. Post

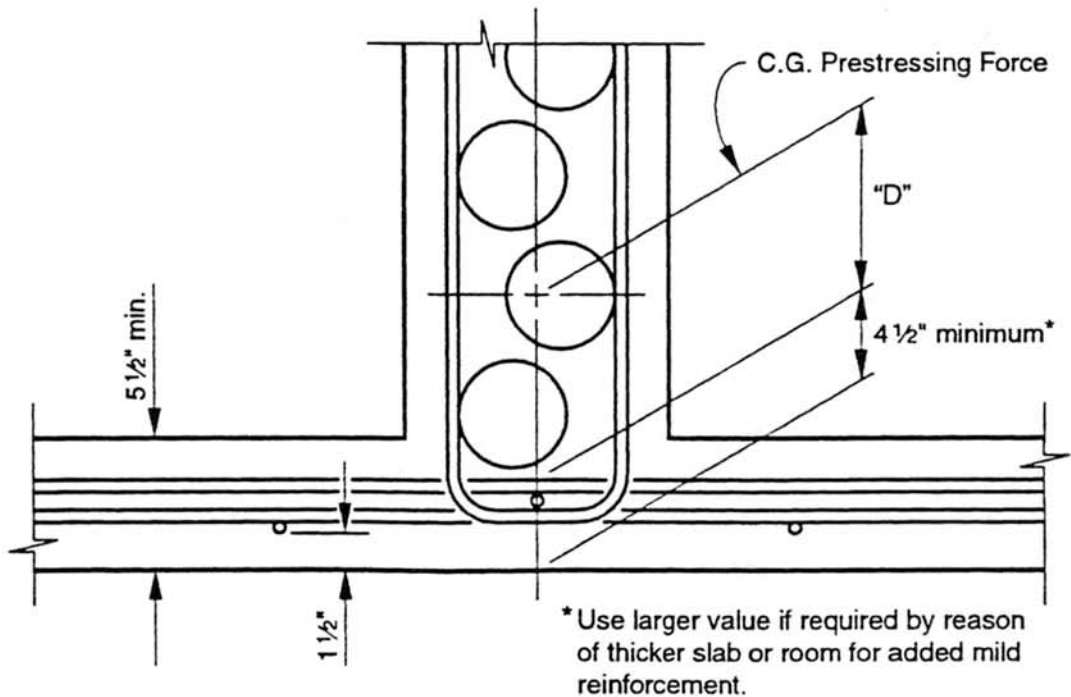
Attachments

EKT/FH:jlw

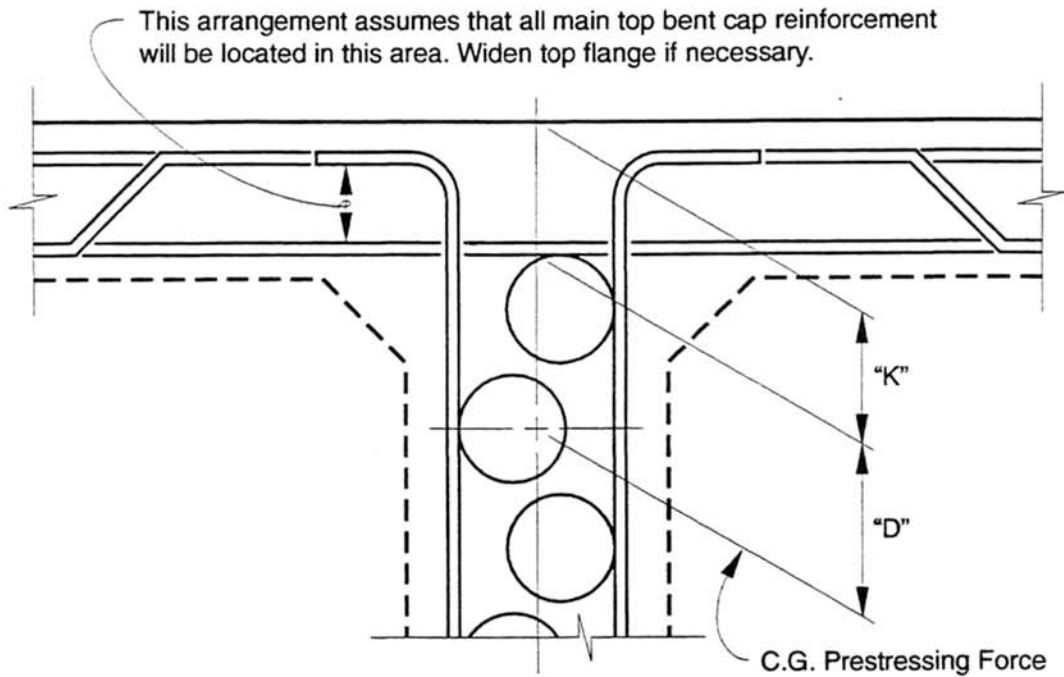


"K" – Varies depending on location of deck or bent reinforcing steel.

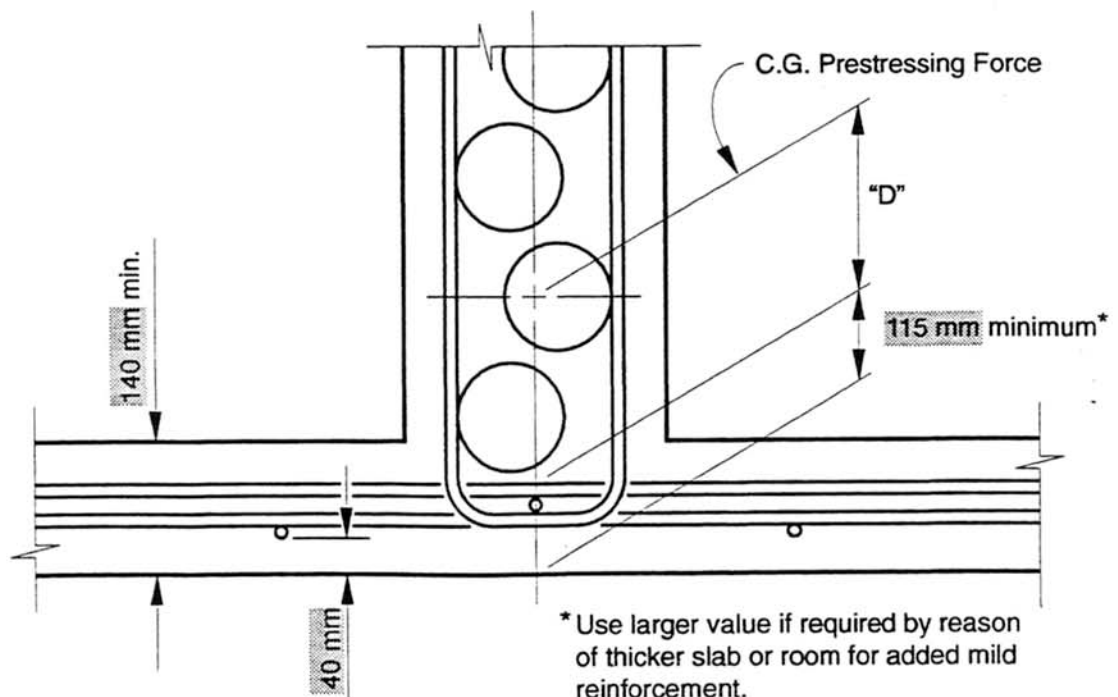
"D" – See "D" Chart.



ATTACHMENT 1

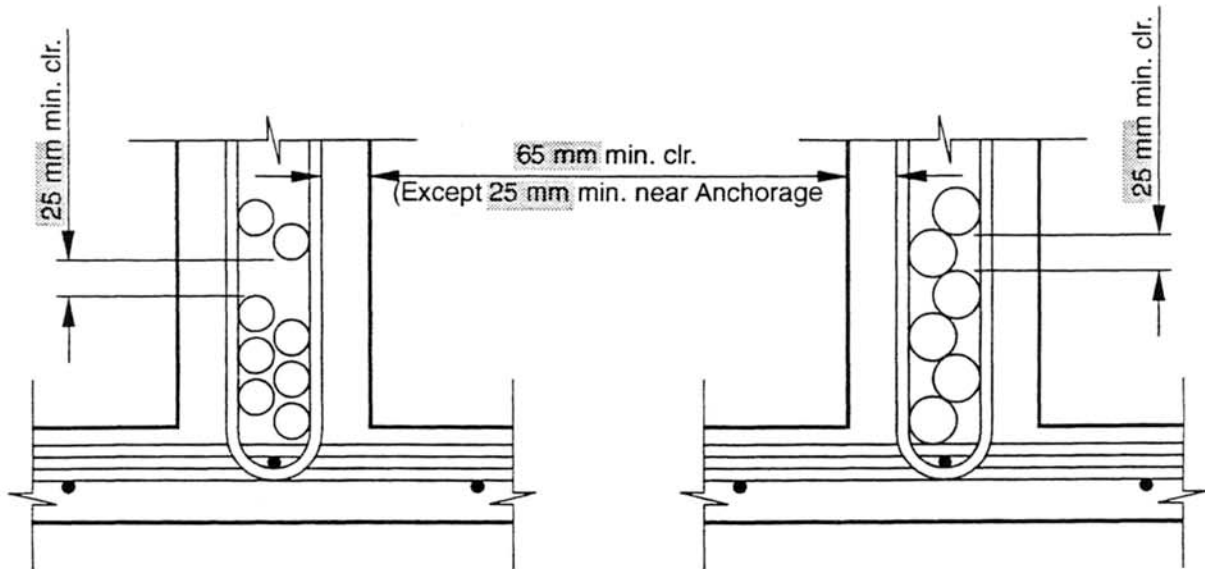


"K" – Varies depending on location of deck or bent reinforcing steel.
 "D" – See "D" Chart.



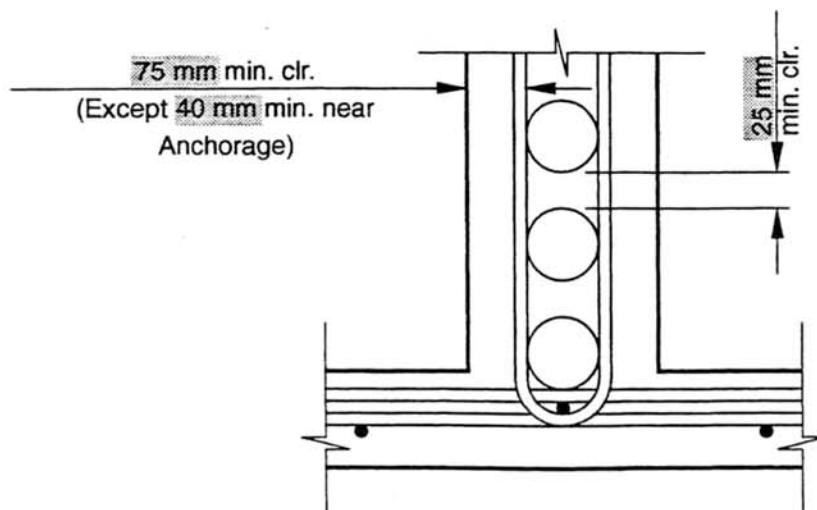
Clearance Requirements for Ducts

Shown for a 300 mm girder stem. Same minimum clearances apply to other stem widths.



DUCTS 75 mm O.D. AND LESS

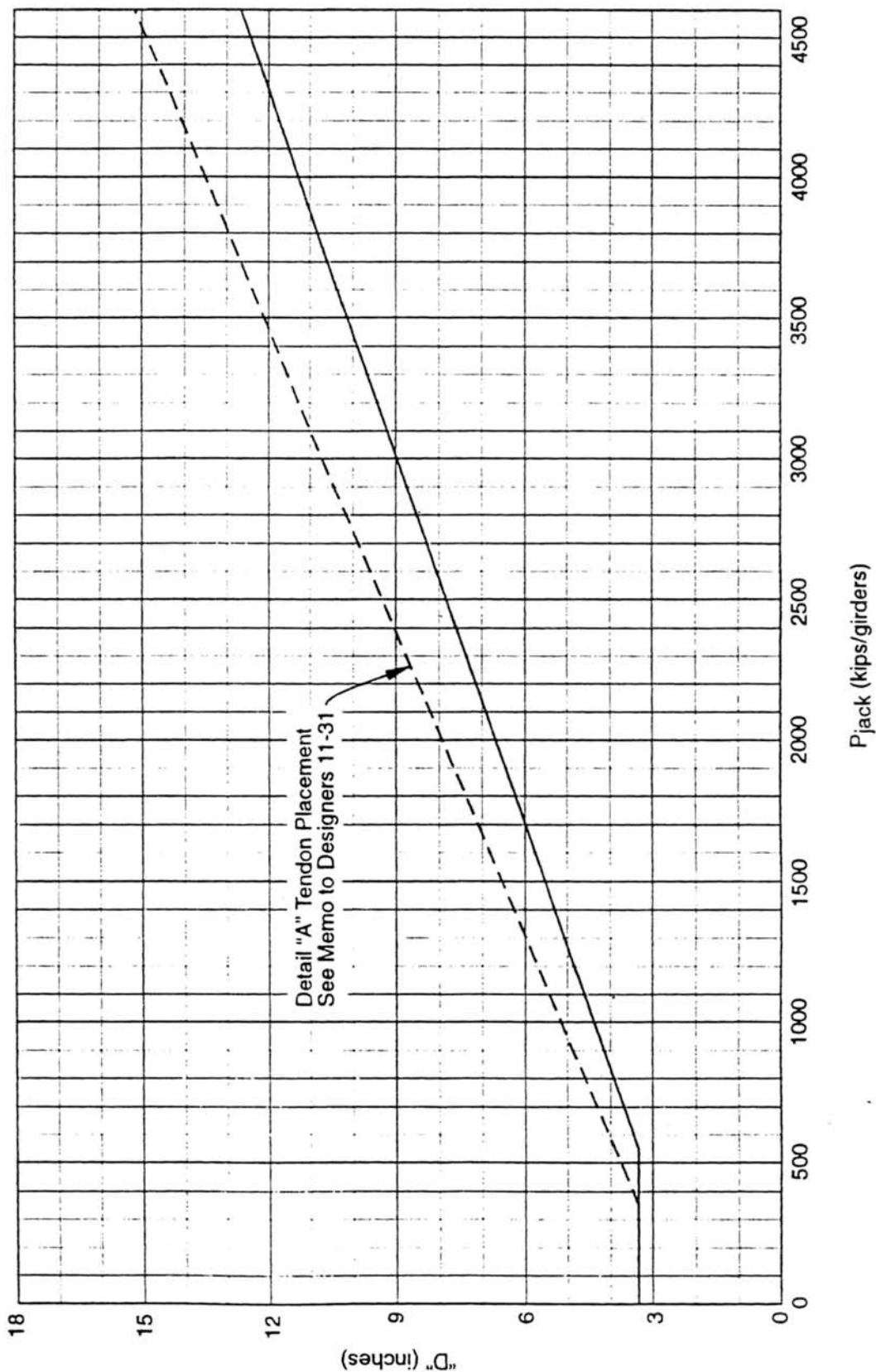
DUCTS OVER 75 mm O.D. TO 115 mm O.D.



DUCTS OVER 115 mm O.D.



"D" Chart for Cast-In-Place Girders



ATTACHMENT 3

“D” Chart for Cast-In-Place Girders

